

Practitioner's Docket No. TRW 2 0273

## CHAPTER II

## Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P., § 601, 7th ed.

TRANSMITTAL LETTER  
TO THE UNITED STATES ELECTED OFFICE (EO/US)  
(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/DE00/00879 22 March 2000 14 May 1999  
INTERNATIONAL APPLICATION NO. INTERNATIONAL FILING DATE PRIORITY DATE CLAIMED  
LIQUID CRYSTAL DISPLAY  
TITLE OF INVENTION  
Lars Birke  
APPLICANT(S)

Box PCT  
Assistant Commissioner for Patents  
Washington D.C. 20231  
ATTENTION: EO/US

**CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10\***  
(When using Express Mail, the Express Mail label number is mandatory;  
Express Mail certification is optional.)

I hereby certify that, on the date shown below, this correspondence is being:

## MAILING

☐ deposited with the United States Postal Service in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

37 C.F.R. § 1.8(a)

37 C.F.R. § 1.10 \*

☐ with sufficient postage as first class mail.

☒ as "Express Mail Post Office to Addressee"

Mailing Label No. EL 852683134 US (mandatory)

## TRANSMISSION

☐ facsimile transmitted to the Patent and Trademark Office, (703) \_\_\_\_\_

Signature

Date: Nov. 15, 2001Barbara J. Whaley

(type or print name of person certifying)

\* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

**NOTE:** To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

**WARNING:** Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8.

**NOTE:** Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:

- a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).
- b. ☐ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

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## 2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
<input checked="" type="checkbox"/>	TOTAL CLAIMS	9 - 20 =	0	× \$18.00 =	\$
	INDEPENDENT CLAIMS	1 - 3 =	0	× \$80.00 =	
	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00	
BASIC FEE**	<input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 C.F.R. § 1.492(a)(4)) ..... \$100.00 <input type="checkbox"/> and the above requirements are not met (37 C.F.R. § 1.492(a)(1)) ..... \$690.00 <input checked="" type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 C.F.R. § 1.492(a)(2)) ..... \$710.00 <input type="checkbox"/> has not been paid (37 C.F.R. § 1.492(a)(3)) ..... \$1000.00 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. § 1.492(a)(5)) ..... \$860.00				890.00
	Total of above Calculations				= 890.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Assertion must be made. (note 37 C.F.R. § 1.27)				-
	Subtotal				890.00
	Total National Fee				\$ 890.00
	Fee for recording the enclosed assignment document \$40.00 (37 C.F.R. § 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$ 890.00

\*See attached Preliminary Amendment Reducing the Number of Claims.

- ☒ Attached is a ☒ check ☐ money order in the amount of \$ \_\_\_\_\_
- ☐ Authorization is hereby made to charge the amount of \$ \_\_\_\_\_
- ☒ to Deposit Account No. 06-0308
- ☐ to Credit card as shown on the attached credit card information authorization form PTO-2038.

**WARNING:** Credit card information should **not** be included on this form as it may become public.

- ☒ Charge any additional fees required by this paper or credit any overpayment in the manner authorized above.

A duplicate of this paper is attached.

**\*\*WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: \* \* \* (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

**WARNING:** If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

☐ **Assertion of Small Entity Status**

☐ **Applicant hereby asserts status as a small entity under 37 C.F.R. § 1.27.**

**NOTE:** 37 C.F.R. § 1.27(c) deals with the assertion of small entity status, whether by a written specific declaration thereof or by payment as a small entity of the basic filing fee or the fee for the entry into the national phase as states:

"(c) Assertion of small entity status. Any party (person, small business concern or nonprofit organization) should make a determination, pursuant to paragraph (f) of this section, of entitlement to be accorded small entity status based on the definitions set forth in paragraph (a) of this section, and must, in order to establish small entity status for the purpose of paying small entity fees, actually make an assertion of entitlement to small entity status, in the manner set forth in paragraphs (c)(1) or (c)(3) of this section, in the application or patent in which such small entity fees are to be paid.

(1) Assertion by writing. Small entity status may be established by a written assertion of entitlement to small entity status. A written assertion must:

(i) Be clearly identifiable;

(ii) Be signed (see paragraph (c)(2) of this section); and

(iii) Convey the concept of entitlement to small entity status, such as by stating that applicant is a small entity, or that small entity status is entitled to be asserted for the application or patent. While no specific words or wording are required to assert small entity status, the intent to assert small entity status must be clearly indicated in order to comply with the assertion requirement.

(2) Parties who can sign and file the written assertion. The written assertion can be signed by:

(i) One of the parties identified in §§ 1.33(b) (e.g., an attorney or agent registered with the Office), §§ 3.73(b) of this chapter notwithstanding, who can also file the written assertion;

(ii) At least one of the individuals identified as an inventor (even though a §§ 1.63 executed oath or declaration has not been submitted), notwithstanding §§ 1.33(b)(4), who can also file the written assertion pursuant to the exception under §§ 1.33(b) of this part; or

(iii) An assignee of an undivided part interest, notwithstanding §§ 1.33(b)(3) and 3.73(b) of this chapter, but the partial assignee cannot file the assertion without resort to a party identified under §§ 1.33(b) of this part.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 4 of 9)

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(Ref.86-4/01 Pub.605)

FORM 13-18

13-163

(3) Assertion by payment of the small entity basic filing or basic national fee. The payment, by any party, of the exact amount of one of the small entity basic filing fees set forth in §§ 1.16(a), (f), (g), (h), or (k), or one of the small entity basic national fees set forth in §§ 1.492(a)(1), (a)(2), (a)(3), (a)(4), or (a)(5), will be treated as a written assertion of entitlement to small entity status even if the type of basic filing or basic national fee is inadvertently selected in error.

(i) If the Office accords small entity status based on payment of a small entity basic filing or basic national fee under paragraph (c)(3) of this section that is not applicable to that application, any balance of the small entity fee that is applicable to that application will be due along with the appropriate surcharge set forth in §§ 1.16(e), or §§ 1.16(f).

(ii) The payment of any small entity fee other than those set forth in paragraph (c)(3) of this section (whether in the exact fee amount or not) will not be treated as a written assertion of entitlement to small entity status and will not be sufficient to establish small entity status in an application or a patent."

3. ☒ A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☐ is transmitted herewith.
- b. ☐ is not required, as the application was filed with the United States Receiving Office.
- c. ☒ has been transmitted
- i. ☒ by the International Bureau.
- Date of mailing of the application (from form PCT/1B/308):  
date unknown
- ii. ☐ by applicant on \_\_\_\_\_. (Date)

4. ☒ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

- a. ☒ is transmitted herewith.
- b. ☐ is not required as the application was filed in English.
- c. ☐ was previously transmitted by applicant on \_\_\_\_\_. (Date)
- d. ☐ will follow.

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5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.

- a. ☐ are transmitted herewith.  
 b. ☐ have been transmitted  
     i. ☐ by the International Bureau.

Date of mailing of the amendment (from form PCT/1B/308):  
 \_\_\_\_\_

- ii. ☐ by applicant on \_\_\_\_\_ (Date)  
 c. ☒ have not been transmitted as  
     i. ☒ applicant chose not to make amendments under PCT Article 19.  
       Date of mailing of Search Report (from form PCT/ISA/210.):  
       15 Sep 00  
     ii. ☒ the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☒ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. § 371(c)(3)):

- a. ☐ is transmitted herewith.  
 b. ☐ is not required as the amendments were made in the English language.  
 c. ☒ has not been transmitted for reasons indicated at point 5(c) above.

7. ☒ A copy of the international examination report (PCT/IPEA/409)

- ☒ is transmitted herewith. (with partial translation)  
☐ is not required as the application was filed with the United States Receiving Office.

8. ☐ Annex(es) to the international preliminary examination report

- a. ☐ is/are transmitted herewith.  
 b. ☐ is/are not required as the application was filed with the United States Receiving Office.

9. ☐ A translation of the annexes to the international preliminary examination report

- a. ☐ is transmitted herewith.  
 b. ☐ is not required as the annexes are in the English language.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 6 of 9)

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10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115
- a. ☐ was previously submitted by applicant on \_\_\_\_\_. (Date)
  - b. ☐ is submitted herewith, and such oath or declaration
    - i. ☐ is attached to the application.
    - ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.
  - c. ☒ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☒ is transmitted herewith.
  - b. ☐ has been transmitted by the International Bureau.  
Date of mailing (from form PCT/IB/308): \_\_\_\_\_
  - c. ☐ is not required, as the application was searched by the United States International Searching Authority.
  - d. ☐ will be transmitted promptly upon request.
  - e. ☐ has been submitted by applicant on \_\_\_\_\_. (Date)
12. ☒ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:
- a. ☒ is transmitted herewith.

Also transmitted herewith is/are:

- ☒ Form PTO-1449 (PTO/SB/08A and 08B).
  - ☒ Copies of citations listed.
  - b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).
  - c. ☐ was previously submitted by applicant on \_\_\_\_\_. (Date)
13. ☐ An assignment document is transmitted herewith for recording.
- A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

14. ☒ Additional documents:
- a. ☒ Copy of request (PCT/RO/101)
  - b. ☒ International Publication No. WO 00/70396
    - i. ☐ Specification, claims and drawing
    - ii. ☒ Front page only
  - c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
  - d. ☒ Other  
Voluntary Submission of Substitute Specification Under  
37 CFR 1.125; PCT/IPEA/416; PCT/RO/101
15. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.
  - b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on \_\_\_\_\_, namely:
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

#### AUTHORIZATION TO CHARGE ADDITIONAL FEES

**WARNING:** Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.

**NOTE:** "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

**NOTE:** "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☒ Please charge, in the manner authorized above, the following additional fees that may be required by this paper and during the entire pendency of this application:

☒ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

**WARNING:** Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 8 of 9)

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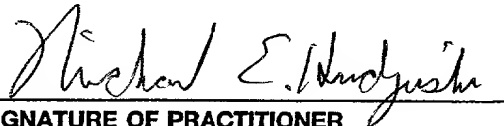
☒ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

☒ 37 C.F.R. § 1.17 (application processing fees)☒ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a).☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☒ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).


SIGNATURE OF PRACTITIONER

Reg. No.: 26,482 / 34,185

Tel. No.: (216 ) 861-5582

Customer No.:

James W. McKee / Michael E. Hudzinski(type or print name of practitioner)FAY, SHARPE, FAGAN, MINNICH & MCKEE, LLP1100 Superior Avenue, Seventh FloorP.O. AddressCleveland, OH 44114-2518

**EXPRESS MAIL CERTIFICATE**

"Express Mail" EL 852683134 US  
Date of Deposit: November 14, 2001

I hereby certify that this **PRELIMINARY AMENDMENT** is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to: Assistant Commissioner For Patents, Washington, D.C. 20231

By Barbara J. Whaley  
Barbara J. Whaley

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: ) Examiner: Unknown  
Lars BIRKE )  
Serial No.: Unknown ) Art Unit: Unknown  
Filed: Herewith )  
For: **LIQUID CRYSTAL DISPLAY** )  
Date of Last Office Action: )  
None )  
Atty Docket No.: TRW 2 0273 )

Cleveland, OH 44114  
November 14, 2001

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, DC 20231

Dear Sir:

Prior to substantive examination of the above-referenced patent application, applicant respectfully requests amendment of the application as follows:

CLEAN VERSION OF CLAIMS

November 14, 2001

IN THE CLAIMS:

Please amend claims 1-9 to read as follows:

1. (Amended) A liquid crystal display comprising:  
a housing (10);  
a liquid crystal cell functioning as display, disposed  
on said housing;

5 a support 2, configured as reflector; and,  
a heating device for the display (1), the heating device  
including a metallic layer (8) applied directly onto the  
support (2).

2. (Amended) The display apparatus according to claim  
1, wherein:

the support (2) is plastic; and, the metallic layer (8)  
is a bonding layer applied directly onto the support and a  
5 galvanic coating applied onto the bonding layer.

3. (Amended) The display apparatus according to claim  
1, wherein:

the metallic layer (8) is a foil coated with a galvanic  
bonding layer by deep-drawing and by rear-spraying of the  
5 foil.

4. (Amended) The display apparatus according to claim  
3, wherein:

the galvanic coating is copper.

5. (Amended) The display apparatus according to claim  
1, wherein:

the support (2) consists of metal-coatable and metal non-coatable plastic, and the metal-coatable plastic is in part  
5 chemically metallized.

6. (Amended) The display apparatus according to claim  
1 further including at least one of:

contact pins (12) injected into the support (2)  
contacting the metallic layer (8); and,  
5 metallized plastic surfaces soldered together with a  
conductor plate.

7. (Amended) The display apparatus according to claim  
1 wherein:

the housing (20) and the support (2), equipped with the  
metallic layer (8) as heating device, are a single-piece  
5 component.

8. (Amended) The display apparatus according to claim  
1, wherein:

the plastic support (2) is irradiated with a short-wave  
ultra-violet light of an excimer lamp or an excimer laser and  
5 immersed in a watery solution.

9. (Amended) The display apparatus according to claim  
8, further including:

a galvanic reinforcement of the metallic layer (8).

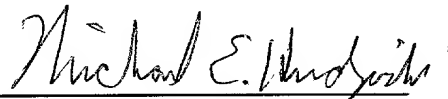
REMARKS

A marked-up version of amended claims 1-9 showing the changes is attached to the end of this document.

Applicant respectfully requests that the foregoing amendments be entered prior to substantive examination of the application. These changes are submitted to place the application in better form for examination.

Respectfully submitted,

FAY, SHARPE, FAGAN,  
MINNICH, & McKEE, LLP



Michael E. Hudzinski  
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Seventh Floor  
Cleveland, Ohio 44114-2518  
(216) 861-5582

VERSION OF CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

November 14, 2001

IN THE CLAIMS:

Please amend claims 1-9 to read as follows:

1. (Amended) A liquid crystal display [whereby in]  
comprising:

a housing (10) [is arranged];

a liquid crystal cell functioning as display, disposed  
5 on said housing;

a support 2, configured as reflector; and,

a heating device for the display (1), [characterized in  
that] the heating device [is] including a metallic layer (8)  
applied directly onto the support (2).

2. (Amended) [Display] The display apparatus according  
to claim 1, [characterized in that the metallic layer (8) is  
produced by coating] wherein:

the support (2) [consisting of] is plastic[, with]; and,

5 the metallic layer (8) is a bonding layer [(primer)]  
applied directly onto the support and [by subsequent] a  
galvanic coating applied onto the bonding layer.

3. (Amended) [Display] The display apparatus according  
to claim 1, [characterized by a coating] wherein:

the metallic layer (8) is a foil coated with a galvanic  
bonding layer [(primer) with subsequent galvanic coating,] by  
5 deep-drawing and by rear-spraying of the foil [for producing  
the metallic layer (8)].

4. (Amended) [Display] The display apparatus according  
to claim [2 or] 3, [characterized in that] wherein:

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the galvanic coating is [of] copper.

5. (Amended) [Display] The display apparatus according to claim 1, [characterized in that] wherein:

the support (2) consists of metal-coatable and metal non-coatable plastic, [whereby] and the metal-coatable plastic  
5 [can be] is in part chemically metallized.

6. (Amended) [Display] The display apparatus according to [one or several of the preceding Claims, characterized by contacting the metallic layer (8) by] claim 1 further including at least one of:

5 contact pins (12) injected into the support (2) [or by] contacting the metallic layer (8); and,  
metallized plastic surfaces soldered together with a conductor plate.

7. (Amended) [Display] The display apparatus according to [one or several of the preceding Claims, characterized in that] claim 1 wherein:

the housing (20) and the support (2), equipped with the  
5 metallic layer (8) as heating device, are [designed as] a single-piece component.

8. (Amended) [Display] The display apparatus according to claim 1, [characterized by radiating] wherein:

the plastic support (2) is irradiated with a short-wave ultra-violet light of an excimer lamp or an excimer laser and  
5 [immersing the irradiated plastic] immersed in a watery solution.

9. (Amended) [Display] The display apparatus according to claim 8, [characterized by] further including:

a galvanic reinforcement of the metallic layer (8).

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JC10 Rec'd PGT/PTO 1 4 NOV 2001

EXPRESS MAIL CERTIFICATE

"Express Mail" EL 852683134 US  
Date of Deposit: November 14, 2001

I hereby certify that this **VOLUNTARY SUBMISSION OF SUBSTITUTE SPECIFICATION** is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to: Assistant Commissioner For Patents, Washington, D.C. 20231

By Barbara J. Whaley  
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**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: ) Examiner: Unknown  
Lars BIRKE )  
Serial No.: Unknown ) Art Unit: Unknown  
Filed: Herewith )  
For: **LIQUID CRYSTAL DISPLAY** )  
Date of Last Office Action: )  
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Atty Docket No.: TRW 2 0273 )  
Cleveland, OH 44114  
November 14, 2001

**VOLUNTARY SUBMISSION OF SUBSTITUTE SPECIFICATION  
UNDER 37 C.F.R. § 1.125**

Assistant Commissioner for Patents  
Washington, DC 20231

Dear Sir:

Applicant respectfully requests that the attached specification be used as a substitute for the original specification as filed. It is respectfully submitted that the original specification is a direct literal translation of the German priority document and, accordingly, is not in proper idiomatic English. The attached substitute specification is in proper idiomatic English and is in compliance with 37 C.F.R. §1.52(a) and (b).

Applicant respectfully submits that the number and

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nature of the amendments that would be needed to put the original specification into proper idiomatic English would render it difficult to consider the application and to arrange the papers for printing and copying. Accordingly, the attached substitute specification is submitted. By entering the enclosed substitute specification, the Office will receive the advantage of saving the time needed to enter the amendments into the specification and, further, realize a reduction in the number of printing errors that may arise.

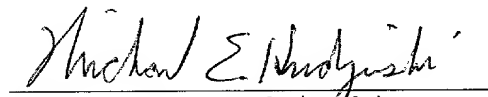
Applicant respectfully submits that the attached substitute specification includes no new matter.

Respectfully submitted,

FAY, SHARPE, FAGAN,  
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14/NOV/01

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## LIQUID CRYSTAL DISPLAY

### Background of the Invention

The subject invention is directed to the liquid crystal display art and, more particularly, to a liquid crystal display apparatus wherein a housing thereof contains a display which functions as a liquid crystal cell, a support which is configured as a reflector, and a heating device for the display.

Liquid crystal displays in general are known in the art. In particular, in DE 44 17 990 A1, a light box is arranged behind a liquid crystal cell. A reverse side of the light box is bordered by a conductor plate provided with lights. A heating wire is located between the lights and the liquid crystal cell so that the liquid crystal cell itself can be selectively heated if temperatures are too low.

Further, in DE 41 40 415 A1, a liquid crystal display is described. The liquid crystal display is provided with a liquid crystal cell having a transparent thin layer heating unit.

One drawback in prior art devices in general, and in the known liquid crystal displays described above particularly, is a high construction cost attributable mainly to the requirement of assuring that the liquid crystal cell is heated at low temperatures.

It would be desirable, therefore, to provide a low cost liquid crystal display of the type described above and with a liquid crystal cell which is heatable at low temperatures in a functionally safe and low cost manner.

### Summary of the Invention

The subject invention provides a new and improved liquid crystal apparatus display which is inexpensive to manufacture and which includes a display functioning as a liquid crystal cell. The display of the subject apparatus is

heatable at low temperatures in a functionally safe manner.

In particular, and in accordance with one aspect of the invention, the heating device is a metallic layer applied directly onto a support member. The metallic layer  
5 beneficially serves as a resistance heating device. By means of the construction of the metallic layer applied directly onto the support, the installation of additional components to heat the liquid crystal cell becomes unnecessary.

In accordance with another aspect of the invention,  
10 in order to provide the support with the metallic layer, several methods are employed. First, a support member functioning as a reflector is coated with a bonding layer as a primer and is subsequently covered with a galvanic coating.

In another form, a foil is coated with the primer  
15 bonding layer and subsequently galvanic coated by deep-drawing the foil and subsequent rear-spraying of the foil in the support member.

According to yet another aspect of the invention, the manufacture of the support member from two kinds of  
20 plastic is effected preferably by a two-component spray method. Thus, a first portion of the support member is manufactured from a plastic material which cannot be metal-coated, and a second portion from a plastic material which can be coated with metal. A subsequent partial metal chemical  
25 metal-coating of the second portion of the support member is performed as a manufacturing step.

Still further in accordance with the invention, selected plastic components are radiated with a short-wave, ultra-violet light of an excimer lamp or an excimer laser.  
30 The radiated plastic is immersed in a watery solution with subsequent further bath steps. The layers applied in such a manner are selectively electrically contacted and galvanically reinforced to a customary thickness for conductor tracks.

In the galvanic coating steps identified above, the

coating layers are preferably copper.

In accordance with yet another aspect of the invention, electrical contacting is selectively performed using suitable mechanical pins, preferably made of metal, injected into the support member, or by soldering metal-coated plastic surfaces directly with an associated conductor plate.

In accordance with a further embodiment of the invention, the housing and support member with the metallic provided as a heating device are formed as a single piece unitary construction. This results in a significant simplification in design and resultant reduction in costs.

Still other advantages and benefits of the invention will become apparent to those skilled in the art upon a reading and understanding of the following detailed description.

#### Brief Description of the Drawings

The invention may take physical form in certain parts and arrangement of parts, the preferred embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof, and wherein:

FIGURE 1 is an exploded view of various elements of the liquid crystal display apparatus in accordance with a first embodiment of the present invention; and,

FIGURE 2 shows the subject liquid crystal display apparatus in accordance with a second embodiment of the invention.

#### Detailed Description of the Preferred Embodiments

The first preferred embodiment of the subject invention will be described with reference to Figure 1. As shown there, a display 1 functioning as a liquid crystal cell

is disposed within a housing 10. In addition, a support member 2 functioning as a reflector is also disposed within the housing 10. A dispersion foil 5 is located beneath the display 1 as illustrated. The dispersion foil 5 is arranged within the housing when the subject liquid crystal display apparatus is assembled. During assembly, an upper frame member 20 includes a plurality of tabs with recesses 15 which are selectively clipped together with corresponding catch tongues 25 provided on the outside of the housing member 10.

In accordance with the invention, the reflective support member 2 is provided with a heating device for selectively heating the liquid crystal cells of the display 1. Preferably, the heating device is a metallic layer 8 applied directly onto the support member 2. In addition, a conductor plate 14 is provided as illustrated. The metallic layer is preferably produced by coating the plastic support member 2 with a bonding layer and by a subsequent galvanic coating step. The galvanic coating is preferably copper.

In accordance with an alternative preferred embodiment, the metallic layer is a foil member coated with a bonding layer and subsequently galvanically treated, whereby, thereafter, the foil is deep-drawn and joined with the support member 2 using a rear-spraying step.

In accordance with yet a further alternative preferred embodiment, the metallic layer is produced using a two-component spray process from a metal-coatable plastic and a non-coatable plastic with a subsequent partial chemical metal coating of the metal-coatable plastic portion of the support member.

Yet alternatively, selected locations or portions of the plastic element are radiated using a short-wave ultraviolet light of an excimer lamp or an excimer laser. Thereafter, the plastic is immersed in a watery solution,

whereby, in further bags within brief periods of time, a continuous copper or nickel layer is developed. These layers are selectively electrically contacted and galvanically reinforced to a customary thickness to provide suitable conductor tracks.

The metallic layer 8 is selectively equipped with suitable contact pins injected into the support member 2 which are formed, as an example, as mechanical metal pins. Alternatively, the contacting is effected directly using metallized plastic surfaces which are soldered together with the conductor plate.

With reference next to Figure 2, a single-piece embodiment of the subject liquid crystal display apparatus is illustrated. As shown there, the conductor plate or housing 10 is connected as a single piece with the support member 2 whereby the support 2 in turn presents a metallic layer 8 which forms a heating device functionally equivalent to that described above in connection with the first embodiment shown in Figure 1.

In accordance with the present invention, the heating device is a metallic layer 8 applied directly onto the support member 2. This results in a significant simplification of the entire unit and a corresponding reduction in costs. These benefits are derived in part by avoidance of the need to install additional components to accomplish the heating function.

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Attorney's File 18.956 KHS/ig

Date: August 2, 2001

Liquid Crystal Cell functioning as Display

The invention relates to a liquid crystal cell which functions as a display, whereby a housing thereof contains a support which is configured as a reflector and a heating device for the display.

This type of liquid crystal display is already known in the state of the art (DE 44 17 990 A1) for which a light box is arranged behind a liquid crystal cell, said light box being bordered at its reverse side by a conductor plate which has lights. Between the lights and the liquid crystal cell is located a heating wire, so that the liquid crystal cell can be heated if temperatures are too low.

Further state of the art is a liquid crystal display whose liquid crystal cell has a transparent thin layer heating unit (DE 41 40 415 A1).

Both known liquid crystal displays have in common that high construction expenditures are required in order to assure that the liquid crystal cell is also heated at low temperatures.

*Amended Page*

The most proximate state of the art is a liquid crystal display with a liquid crystal cell functioning as display, as well as a support configured as a support and a heating device for the display (US-A 4 643 525). Said heating device is constructed relatively complicated and costly.

In addition, a display device is known (EP-A -0 15 360) for which a heating device is arranged in the cell space of the liquid crystal cell, directly or indirectly on the anterior and/or the posterior cell wall, whereby, likewise, significant construction expense is required for mounting said heating device.

Accordingly, the present invention is based on the object of creating a liquid crystal cell functioning as display, whereby said cell can be heated, even at low temperatures, with low constructional expense.

Said object is solved according to one specific embodiment of the invention in that the heating device is a metallic layer applied directly onto the support and that the metallic layer is produced by coating the support made of plastic with a bonding layer, namely a primer, and by subsequent galvanic coating.

Alternatively, for solving said object, there exists the possibility that for manufacturing the metallic layer it is possible to undertake coating a foil with a bonding layer with subsequent galvanic coating, as well as deep-drawing and rear-spraying of the foil. The metallic layer hereby beneficially serves as resistance heating. By means of this type of metallic layer, which is applied directly onto the support, no additional components need to be mounted. *Amended Page*



In order to provide the support with the metallic layer, it is possible to employ the following methods:

1. Coating of the support functioning as reflector with a bonding layer (primer) and with subsequent galvanic coating,
2. Coating of a foil with a bonding layer (primer) and subsequent galvanic coating, deep-drawing of the foil and subsequent rear-spraying of the foil in the support,
3. Manufacturing of the support from a metallizable and a non-metallizable plastic, with subsequent partial chemical metallization of the support. The manufacture of the support from the two kinds of plastic can be done for example by two-component extrusion method.
4. Radiation of a plastic component with a short-wave, ultra-violet light of an Excimer lamp or an Excimer Laser; immersion of the radiated plastic in a watery solution with subsequent additional baths. The layers applied in this fashion can be electrically contacted and galvanically reinforced to thickness customary for conductor tracks.

The galvanic coating with respect to the first-named of the second method can consist, for example, of copper.

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In further embodiment of the invention, contacting can be effected either by means of pins injected into the support, preferably made of metal, or directly via metallized plastic surfaces, which are soldered together with the conductor plate.

In further embodiment of the invention, there exists the possibility that the housing and the support equipped with the metallic layer as heating device are designed as a single piece, which results in substantial simplification in the design and reduction in costs.

In the following, the invention is described in more detail making use of specific embodiments represented in the drawing. The drawing shows as follows:

- Fig. 1.            an oblique view of the various elements of the liquid crystal display;  
 Fig. 2            another embodiment possibility of a single piece version of the liquid crystal display.

In accordance with the graphic representation according to Fig. 1, inside a housing 10 are arranged a liquid crystal cell functioning as display 10, and a support 2, functioning as reflector.

Underneath the display 1 may be located a dispersion foil 5, which likewise is arranged in the housing. Housing 10 is closed above a frame 20, for example by means of recesses 15 of frame 20, which are clipped together with catch tongues 25 at the outside of housing 10.

On support 2 which functions as reflector, is located a heating device, which is designed as

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metallic layer 8, applied directly onto support 2. In addition, a conductor plate 14 is provided.

The metallic layer can be produced by coating the support 2, made of plastic, with a bonding layer and by subsequent galvanic coating. The galvanic coating can consist, for example, of copper.

Another manufacturing possibility for the metallic layer is offered in that a foil is coated with a bonding layer and subsequently galvanically treated, whereby, after that, the foil is deep-drawn and connected with support 2 by rear-spraying.

Another manufacturing possibility for the metallic layer is offered in that the support can be produced for example by two-component spray process from a metal-coatable plastic and a metal non-coatable plastic, with subsequent partial chemical metal-coating of the support.

Alternatively, the possibility also exists that certain locations of the plastic element are radiated with a short-wave ultraviolet light of an Excimer lamp or an Excimer Laser. Subsequent thereto, the plastic is immersed in a watery solution, whereby in further baths, within a brief period of time, develops a continuous copper- or nickel layer. These layers can be electrically contacted and galvanically reinforced to customary thickness for conductor tracks.

The metallic layer 8 can be equipped with contact pins injected into the support 2, which are designed, for example, as metal pins. Another possibility exists in that the contacting is effected directly via metallized plastic surfaces, which are soldered together with the conductor plate.

According to Fig. 2, there also exists the possibility of a single-piece version of the liquid crystal display: In this instance, the conductor plate or the housing 10 is connected as single piece with the support 2, whereby said support 2 in turn presents, similar as for the embodiment according to Fig. 1, a metallic layer 8, which, similar to the embodiment according to Fig. 1, forms a heating device.

Due to the circumstance that the heating device is a metallic layer 8 applied directly onto the support 2, there results significant simplification of the entire unit and a reduction in costs, since no additional components have to be installed.

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Official File Reference Symbol: PCT/DE00/00879

Applicant: TRW Automotive Electronics & Components  
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Attorney's File: 18.956 KHS/ig

Date: August 1, 2001

#### New Patent Claims

1. A liquid crystal cell, functioning as display (1) whereby a housing (10) thereof contains a support (2) configured as reflector and a heating device for the display (1),  
**characterized in that**  
the heating device is a metallic layer (8) applied directly onto the support (2) and  
that the metallic layer (8) is produced by coating the plastic support (2) with a bonding layer, namely primer, and by subsequent galvanic coating.
2. A liquid crystal cell functioning as display, whereby a housing (10) thereof contains a support (2) configured as reflector and a heating device for the display (1),  
**characterized in that**

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the heating device is a metallic layer (8) applied directly onto the support (2) and, furthermore **characterized by**

coating a foil with a bonding layer, namely primer, with subsequent galvanic coating by means of deep-drawing and by rear-spraying of the foil for production of the metallic layer (8).

3. Liquid crystal cell according to Claim 1 or 2, **characterized in that** the galvanic coating consists of copper.
4. Liquid crystal cells according to Claim 1, **characterized in that** the support (2) consists of metallizable and non-metallizable plastic, whereby the metallizable plastic is in part chemically metallizable.
5. Liquid crystal cell according to one or several of the preceding Claims, **characterized by** contacting the metallic layer (8) via contact pins (12) injected into the support (2) or by metallized plastic surfaces soldered together with a conductor plate.
6. Liquid crystal cell according to one or several of the preceding Claims, **characterized in that** the housing (10) and the support (2) equipped with the metallic layer (8) as heating device are configured in a single piece.

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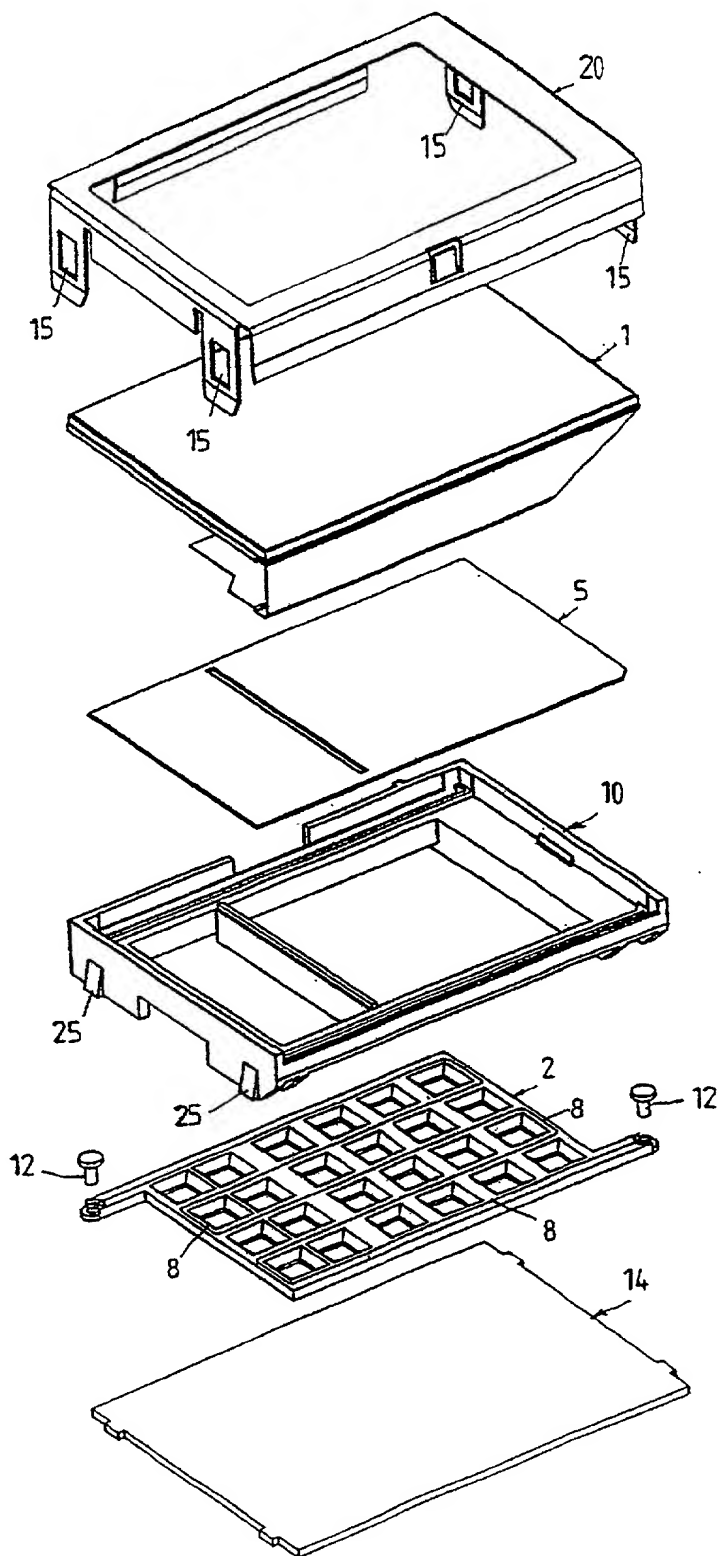
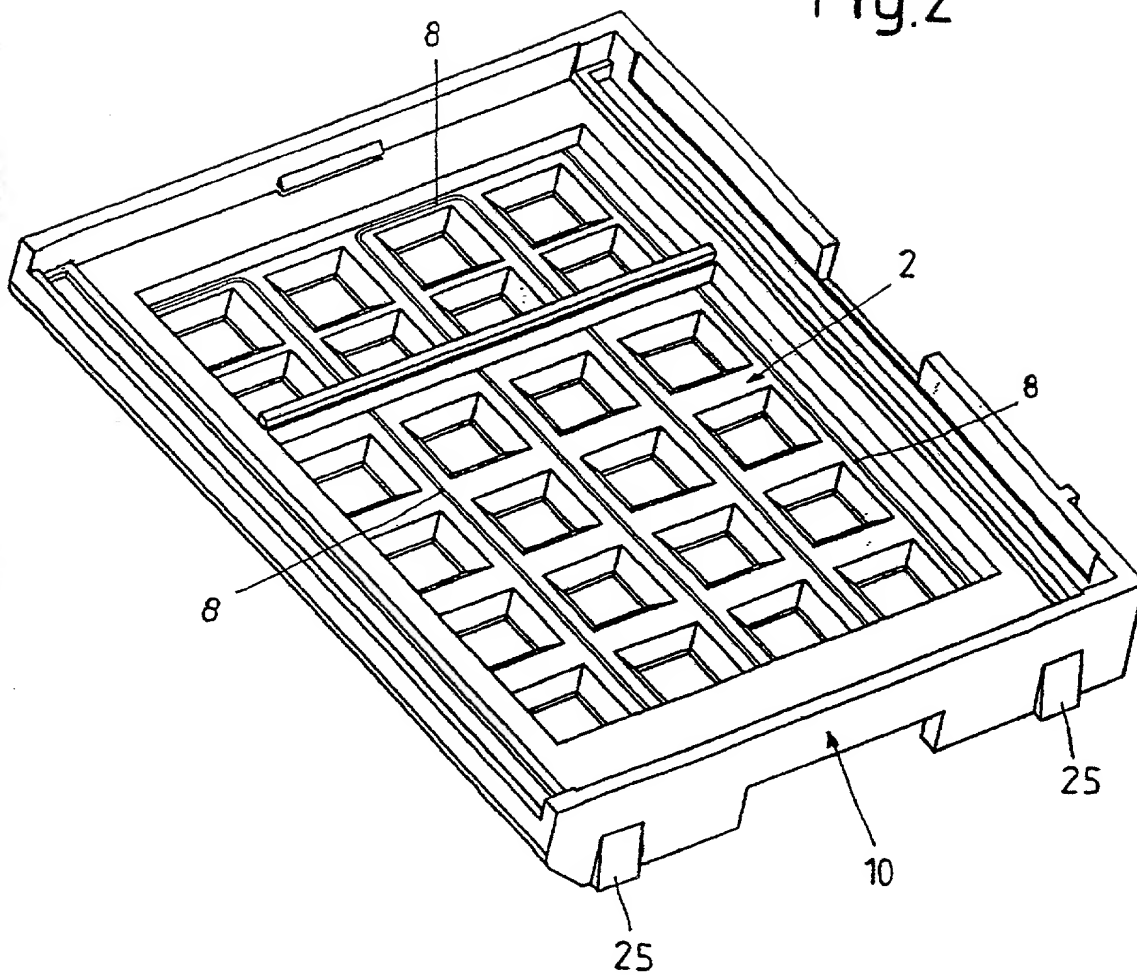


Fig.1

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Fig.2





DECLARATION FOR PATENT APPLICATION

As the below named inventor, I hereby declare that:

My residence, post office address, and citizenship is as stated below next to my name.

I believe I am the original, first, and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**LIQUID CRYSTAL DISPLAY**

the specification of which was filed on November 14, 2001 and was amended on November 14, 2001 by way of Preliminary Amendment and Voluntary Submission of Substitute Specification and accorded Serial No. 09/979,582.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37 Code of Federal Regulations § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Germany 199 22 369.6, Filed May 14, 1999

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Not applicable.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and,

09/979,582

insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PCT Application No. PCT/DE00/00879, Filed March 22, 2000

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00

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